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(54) AN ABSORBENT BODY FOR AN ABSORBENT ARTICLE

ABSORBIERENDER KÖRPER FÜR EINEN ABSORBIERENDEN ARTIKEL

CORPS ABSORBANT POUR UN ARTICLE ABSORBANT

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- Lecture from the International Conference
IMPACT 87 in Hyatt Palm Beaches, West Palm
Beach, Florida, February 26-27, 1987, sponsored
by Marketing/Technology Service, Inc., section
IX-1-6, especially section IX-4, Figure 1 -
Possible Locations.

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EP 0 637 953 B1

DescriptionTechnical Field

5 The present invention relates to an absorbent body which is intended to form the absorbent element of an absorbent article, such as a diaper, an incontinence guard or a sanitary napkin, and includes a first absorbent layer which is based on cellulose fluff-pulp and which is intended to face towards the wearer in use, i.e. to lie proximal to the wearer, and a second absorbent layer which is also based on cellulose fluff-pulp and which is intended to lie distal from the wearer in use, i.e. to face away from the wearer, and which has a high liquid-dispersion capability.

Background of the Invention

10 An absorbent body, or pad, intended for absorbent articles such as disposable diapers, sanitary napkins and incontinence guards is normally formed of one or more layers of cellulose fluff-pulp and often contains so-called superabsorbents, which are polymers that are capable of absorbing several times their own weight of water or body liquid. The absorbent body may also include other constituents, for instance constituents which improve its liquid-dispersing properties or which increase its ability to hold together and its ability to resist deformation in use.

15 One serious problem, primarily encountered with diapers and incontinence guards which are intended to receive and absorb relatively large quantities of liquid, is that the articles often begin to leak before their total absorption capacity has been utilized to the full.

20 Although the use of superabsorbents in absorbent bodies will impart thereto a high absorption capacity and also improve their ability to retain the liquid absorbed, even when the absorbent body is subjected to external pressure forces, present-day superabsorbents have a low absorption rate. Since urination often results in the discharge of large quantities of liquid in the course of some few seconds, the absorbent body will often become temporarily saturated with liquid in local areas, such that further urine discharged by the wearer will leak from the absorbent body.

This premature leakage is, of course, highly irritating to the wearer and also to his/her medic.

25 Another problem encountered with absorbent sanitary articles of the aforescribed kind is one of keeping the surface of the article which lies against the wearer in use as dry as possible during the whole of its use period and to prevent so-called rewetting, i.e. to prevent liquid that has already been absorbed being pressed back out of the absorbent pad and rewetting the wearer's skin or giving rise to leakage. The rewetting properties of an absorbent article are improved to some extent when the absorbent body includes superabsorbents which bind the absorbed liquid chemically, even when the article is subjected to external pressure, for instance when the user sits down. However, one difficulty in this regard is in constructing the absorbent body in a manner which will enable the liquid to spread within the absorbent body and reach the superabsorbent material.

30 Swedish Patent Application SE-A-468744 describes an absorbent body which includes at least two different cellulose fluff-pulps, wherein the fibre structure of the first absorbent layer is comprised chiefly of a first type of fluff-pulp having an open fibre structure and a low liquid-dispersing capability and a critical bulk which exceeds $8 \text{ cm}^3/\text{g}$ at 2.5 kPa, whereas the fibre structure of the second absorbent layer is comprised chiefly of a second type of fluff-pulp having a critical bulk which is beneath $8 \text{ cm}^3/\text{g}$ at 2.5 kPa and having a higher liquid-dispersing capability than the fluff-pulp in the first absorbent layer.

35 As a result of its open fibre structure, the first absorbent layer is able to accommodate a large amount of liquid between its fibres and is therefore able to receive large quantities of liquid over a short period of time, i.e. has a high instantaneous liquid-absorption capability.

40 The second absorbent layer, which has a higher liquid-dispersing capability than the first absorbent layer, is able to drain liquid from the first layer and spread the liquid through the second layer.

45 It is also proposed that the second absorbent layer and possibly also the first absorbent layer shall include a superabsorbent material and it is suggested that this material is admixed essentially uniformly in the fluff-pulp within at least one region of the layer. In this way, there has been produced an absorbent body which has a high instantaneous absorption capacity and the ability to counteract rewetting of the wearer's skin by the liquid already absorbed.

50 Hitherto, an absorbent body in which superabsorbents have been admixed generally uniformly in the fluff-pulp and the absorbent body then compressed has normally been considered to provide the best absorption properties, see for instance EP-B-0 122 042.

The Object of the Invention and Its Most Important Characteristic Features

55 The object of the present invention is to provide an absorbent body of the kind defined in the introduction which possesses further improved absorption properties. This object has been achieved with an absorbent body in which the first layer includes a super-absorbent material of high gel-strength having the ability to swell substantially unaffected by nor-

mally occurring pressure forces, which is admixed essentially uniformly in the fluff-pulp within at least one area of the layer, and in which the second layer includes at least one layer of super-absorbent material disposed between fibre layers.

By admixing a superabsorbent material of high gel-strength in the first layer of the absorbent body, the layer will retain its open fibre structure even when the superabsorbent becomes wet and swells. Thus, instead of expanding so as to block the pores of the capillary system when becoming wet, the superabsorbent will push the fibres apart as it expands, so that the pores in the capillary system will also expand. As a result, further liquid delivered to the absorbent body will be readily taken-up by the fibre structure in the first layer.

The superabsorbent material in the second layer of the absorbent body is applied in the form of a layer instead of in admixture with the fibres as in the case of the first layer. It has surprisingly been found that this results in improved liquid dispersion, improved retentiveness and improved absorption rate in the second layer. The superabsorbent material in the second layer will preferably also have a high gel-strength, so that optimum liquid-dispersion properties are obtained.

The rate of dispersion of a cellulose body which has superabsorbent material mixed therein will be lower than in a cellulose body which contains no super-absorbent. This is essential in order for the first layer to function as a liquid-receiving layer which is able to receive large quantities of liquid.

On the other hand, when a layer of superabsorbent material is placed between cellulose layers, the dispersion properties of the purely cellulose body are retained and the liquid is therefore able to reach the superabsorbent material distributed in the second layer more easily, this second layer functioning as a liquid-dispersion layer.

Further features of the invention and advantages afforded thereby will be evident from the depending Claims and from the following description.

Brief Description of the Drawings

The invention will now be described in more detail with reference to exemplifying embodiments thereof and also with reference to the accompanying drawings.

Figure 1 is a top view of a diaper as seen from the side which lies proximal to the wearer in use.

Figure 2 is a sectional view taken on the line II-II in Figure 2.

Description of Embodiments

The diaper illustrated in Figure 1 is comprised of a liquid-permeable casing sheet 1, for instance a non-woven or perforated plastic film, a liquid-impermeable casing sheet 2, for instance a plastic film or a hydrophobic non-woven material, and an absorbent body 3 enclosed between the two layers 1, 2.

The diaper is intended to embrace the lower part of the wearer's trunk, in the manner of a pair of absorbent underpants. To this end, the diaper is provided with a back part 4 which, when the diaper is worn, will be located rearwardly on the wearer, a front part 5 which, when the diaper is worn, will be located forwardly on the wearer, and a narrower crotch part 6 which extends between the back part 4 and the front part 5 of the diaper and which, when the diaper is worn, is located in the crotch region of the wearer, between the thighs thereof. Fastener tabs 7, 8 are provided on the side edges 9, 10 of the back part 4 extending in the longitudinal direction of the diaper, close to the rear waist edge 11 of said diaper, so as to enable the diaper to be secured in the desired pants-like form. When the diaper is to be used, the fastener tabs 7, 8 are fastened to the outer surface of the front diaper part 5, close to the forward waist edge 12, thereby holding the diaper together around the wearer's waist.

The diaper illustrated in Figure 1 also includes prestretched elastic devices 13, 14 which extend over the diaper in a V-shaped pattern, with the apex of the V located on the forward waist edge 12 of the diaper. The elastic devices 13, 14 may consist of any suitable material, such as elastic foam, elastic bands or covered elastic threads. For the sake of convenience, the elastic devices 13, 14 have been shown in a stretched state. However, as soon as the tension is removed, the elastic devices will contract and therewith form elastic leg openings on the diaper.

The absorbent body 3 is comprised of a number of mutually different layers. Nearest to the liquid-permeable casing sheet 1 is a thin cellulose fluffpulp layer 15 of high critical bulk, large pore volume and low liquid-dispersion ability. By critical bulk is meant the bulk at which a cellulose body will neither collapse nor expand when becoming wet. A cellulose fluff-pulp of high critical bulk will retain an open structure of large pore volume even when wet.

Seen in a direction towards the liquid-impermeable casing sheet 2, there then follows a first absorbent layer 16 which is comprised of cellulose fluff-pulp of large pore volume, high wet resiliency and low liquid-dispersion ability, and a second absorbent layer 17 comprised of cellulose fluff-pulp of low pore volume, low wet resiliency and high liquid-dispersion ability. Both absorbent layers also include superabsorbent material.

The cellulose fluff-pulp layer 15 lying closest to the liquid-permeable casing layer 1, and also the second absorbent layer 17 have a T-configuration with the cross-member of the T being located at the front diaper part 5. The first absorbent layer 16, on the other hand, has an oval shape and is located generally in the crotch part 6 of the diaper, around the so-called wetting point.

It will be understood that the illustrated and described diaper is merely intended to exemplify the invention and shall not be considered to limit the scope of the invention. For instance, the shape of the diaper and its construction in other respects may be varied. Similarly, the first absorbent layer 16 may full cover the second absorbent layer. Furthermore, the thin cellulose fluff-pulp layer 15 located nearest the liquid-permeable casing layer 1 can be omitted.

The wetting point is that area of the diaper surface onto which the discharged body liquid first comes into contact. As will be understood, it is not possible in practice to establish any specific point or area in this regard, although it can be generally accepted that the body liquid will be delivered to the diaper within a given, limited area thereof. In general, this area is displaced slightly towards the front diaper part, in the case of both men and women wearers. Since the dispersion of the liquid in the first absorbent layer 16 is only slight, it is sufficient for this layer to cover solely the area of the diaper in which wetting is most likely to occur.

The first absorbent layer 16 thus functions as a receiving area for discharged body liquid. Because the fibre structure in this layer is porous, the liquid is able to quickly penetrate into the layer 16 and be collected thereby.

A chemi-thermo mechanical cellulose fluff-pulp, so-called CTMP, has generally a greater pore volume, higher wet-stability and lower liquid-dispersing ability than a chemically manufactured fluff-pulp. The fact that the fluff-pulp has a large pore volume signifies that the capillaries between the fibres are coarse, which is naturally one reason why the liquid-dispersing ability is low, since this ability decreases with increasing capillary sizes. The liquid-dispersing ability of the fluff-pulp and its affinity to liquid is also due to the fact that the wood substances that remain in the fluff-pulp impart to the fibres of CTMP-pulp other surface properties than the fibres of chemical pulps.

One reason for the high wet-stability of the CTMP-pulps is because they contain relatively thick or coarse fibres having a fibre weight between 180 and 600 mg/km. Furthermore, CTMP-pulp contains lignin, which functions as a cellulose-fibre stiffening element. Since lignin retains its structure even when wet, fibres which have a high lignin content are relatively rigid, even in a wet state. Consequently, a fibre layer which is comprised substantially of such fibres will have good wet-stability and a high critical bulk, above 8 cm³/g at 2.5 kPa.

Consequently, CTMP fluff-pulp is suitable for use in the first absorbent layer 16. This layer may consist entirely, or at least to a substantial part, of CTMP fluff-pulp or some other fluff-pulp which has similar properties, e.g. Southern pine. It is also conceivable to use chemical pulp in the first absorbent layer 16, despite the high liquid-dispersing capacity of the chemical pulp, since this capacity is lowered when superabsorbent material is admixed with the pulp. Naturally, absorbent materials other than fluff-pulp are conceivable, such as synthetic fibres or mixtures of synthetic fibres and fluff-pulp.

The first absorbent layer 16 contains between 2 and 30%, preferably between 2 and 15%, superabsorbent 18, calculated on the total dry weight of the layer in that area in which the superabsorbent is mixed. The superabsorbent is distributed generally uniformly in the layer, within at least one area or region thereof, and is intended to absorb and to bind any liquid that remains in the layer, even after the layer has been drained by the second absorbent layer 17. Because the first absorbent layer 16 includes superabsorbents, there is obtained a very dry surface, since the fibre interspaces in the layer are emptied of liquid practically completely.

As before mentioned, the superabsorbent 18 in the first absorbent layer shall have a high gel-strength, so that the layer will retain an open fibre structure even when becoming wet.

The second absorbent layer 17 also contains super-absorbent material, in this case in the form of one or more layers 20 of flakes, fibres, granules, powder or the like. This layer 20 extends either over the whole of the absorbent layer 17 or is restricted to at least one area thereof. This area 19 may, for instance, be slightly larger than the first absorbent layer 16 and, similar to said layer, may be limited essentially to the crotch part of the diaper.

The proportion of superabsorbent included in the second absorbent layer 17 will preferably be between 2 and 60%, preferably between 10 and 50%, calculated on the total dry weight of the layer.

The superabsorbent in the second absorbent layer 17 will preferably have a high gel-strength, i.e. have the ability to swell substantially unaffected by normally occurring pressure forces, so as not to block and impede dispersion of the liquid. Characteristic of these superabsorbents is that they have a high degree of cross-linking which renders them more difficult to compress in comparison with a gel that has a lower degree of cross-linking.

Other important properties of the superabsorbents suitable for use with the present invention are high absorbency under pressure and a high absorption rate.

The fluff-pulp in at least the layer 17a of the second absorbent layer 17 which is proximal to, or faces towards, the first absorbent layer 16 will preferably be comprised substantially of fluff-pulp or some other absorbent material having a high liquid-dispersion capability. Chemically produced fluff-pulps generally have good liquid-dispersing capability. Since chemical fluff-pulps are chiefly comprised of solely cellulose material, the fine fibres have a weight of 140-190 mg/km, a low degree of stiffness and low wet-stability, and a critical bulk beneath 8 cm³/g at 2.5 kPa. A fibre structure

which is comprised chiefly of chemically produced cellulose fluff-pulp will have a large number of fibres per unit volume, which provides a dense structure with fine capillaries. When such a fibre structure becomes wet, the fibre structure collapses because of the low wet-rigidity of the fibres and forms a structure which has a relatively low absorption capacity but a high liquid-dispersing capacity.

Because, in accordance with the preferred embodiment, there is a difference in capillary size between the fluff-pulps in the first absorbent layer 16 and the fluff-pulp layer 17a of the second absorbent layer 17, said layer 17a lying proximal to the first absorbent layer 16, liquid is actively transported from the layer 16 to the layer 17, since the capillary forces constantly act to transport liquid in a direction away from the coarser capillaries to the finer capillaries. These capillary differences also counteract rewetting of the skin by liquid that has already been absorbed in the second absorbent layer 17.

Thus, discharged body liquid is first collected in the first absorbent layer 16, which functions as a buffer or reservoir, this layer being successively drained as the second absorbent layer 17 absorbs and disperses liquid.

The second fluff-pulp layer 17b in the second absorbent layer 17 may consist of a chosen fluff-pulp, for instance CTMP-pulp or chemical pulp.

When forming the second absorbent layer 17, there is preferably used a suction drum whose outer cylindrical surface is provided with forming recesses. The drum interior is placed under vacuum conditions and the bottom surfaces of the forming recesses have a sieve-like configuration. The second absorbent layer 17 is formed in three stages. In a first stage, airborne pulp fibres are delivered to the forming recesses and the resultant layer is compressed to some extent by the vacuum prevailing in the drum. In a second step, superabsorbent material is strewn over the pulp layer. The vacuum is discontinued in this second stage, so that the pulp fibres will loosen from one another to some extent and therewith allow the superabsorbent particles to penetrate slightly in between the fibres. This results in a better bond between pulp layer and superabsorbent layer. In a third stage, a layer of pulp is formed over the layer of superabsorbent and the absorbent layer 17 is compressed to some extent with the aid of a vacuum, prior to said layer being placed together with the first absorbent layer 16, whereafter the layers are finally compressed.

Comparison tests have been carried out between an inventive absorbent body and an absorbent body in which the superabsorbent was mixed generally homogeneously with the fluff-pulp fibres in both absorbent layers.

Example 1

Rewetting

Rewetting was tested for two fluff-bodies A and B, each comprised of two absorbent layers, an upper layer comprised of a softwood-type CTMP-pulp and a lower layer comprised of chemical softwood pulp. The upper absorbent layer of body A had a surface weight of 350 g/m² and contained 1.2 g superabsorbent which was mixed generally homogeneously with the fluff-pulp fibres. The lower absorbent layer of body A was comprised of two fluff-pulp layers, each having a surface weight of 350 g/m², and an intermediate layer of 4.8 g superabsorbent of high gel-strength.

The upper absorbent layer of the body B had a surface weight of 400 g/m² and contained 1.2 g superabsorbent of the same type used in body A. This superabsorbent was mixed generally homogeneously with the fluff-pulp fibres. The lower absorbent layer of body B had a surface weight of 700 g/m² and contained 4.8 g superabsorbent of the same type used in body A. The super-absorbent was mixed generally homogeneously with the fluff-pulp fibres.

The test bodies were compressed to a bulk of 7 cm³/g.

Tests were also carried out on two other fluff-pulp bodies C and D which were constructed in a manner corresponding to bodies A and B, but with the difference that the fluff-pulp in the lower absorbent layer also comprised CTMP softwood pulp.

3*28 ml of sample liquid (0.9% NaCl solution) were poured onto the wetting point through a pipe at intervals of 20 and 40 minutes respectively. Filter paper was placed over the wetting point and loaded with a weight of 1.1 kg (2.8 kpa) for 15 seconds. The filter papers were weighed before and after being subjected to load and rewetting was recorded.

The results are shown in the following Table 1.

Table 1

5	Sample	Pulp	Superabsorbent	Rewetting
	body	upper/ lower core	applied in upper/ lower core	(g)
10	-----	-----	-----	-----
	--	--	--	--
15	A	CTMP/CP	mix/layer	1.3
	B	CTMP/CP	mix/mix	1.5
	C	CTMP/CTMP	mix/layer	5.1
20	D	CTMP/CTMP	mix/mix	9.4

Example 2

A comparison test was also carried out with respect to the second absorbent layer 17. This comparison was made between test bodies in which pulp fibres and superabsorbent particles were mixed essentially homogeneously with one another and in which the super-absorbent particles were applied in a layer as described in the foregoing in accordance with the invention. The test bodies weighed 14 g, excluding superabsorbent. The pulp used was a chemical softwood pulp and the superabsorbent was of the kind which exhibits a high gel-strength. All test bodies had a bulk of 12 cm³/g.

Instantaneous absorption, rewetting, horizontal liquid dispersion and retentiveness were measured in respect of test bodies that contained 10 or 30% superabsorbent either mixed essentially homogeneously in the pulp or placed in layers.

The analyses were carried out in the following manner.

Instantaneous Absorption

Four quantities of liquid (0.9% NaCl solution), each of 28 ml, were delivered to the bodies at 20-minute intervals. The time taken for all liquid to be absorbed was measured (visual observation). The results obtained after the last delivery are shown in Table 2.

Table 2

Superabsorbent (%) Mix/Layer Instantaneous Abs.
(s)

5

10

15

20

Rewetting

25

Rewetting tests were carried out in respect of test bodies corresponding to the test bodies used in the instantaneous absorption test. The tests were carried out in a manner corresponding to the method applied in the rewetting test described in Example 1. The results are shown in Table 3.

Table 3

30

Superabsorbent (%) Mix/Layer Rewetting (g)

35

40

45

These results show that with 10% superabsorbents, a much lower rewetting tendency is obtained with the superabsorbents placed in layers in comparison with superabsorbents that are mixed with the pulp fibres. With 30% superabsorbents, the result obtained with layered superabsorbents was essentially the same as that obtained with superabsorbents that were mixed with the pulp fibres.

Horizontal Dispersion

55

The dispersion test was carried out with test bodies that corresponded to the above-mentioned. The test were carried out in the following manner: 3*28 ml test liquid (0.9% NaCl solution) were poured through a pipe onto the wetting point at 20-minute intervals. The horizontal dispersion was measured in cm after 60 min. from the time of the first addition.

The results are shown in the following Table 4.

Table 4

Superabsorbent (%)	Mix/Layer	Horizontal Dispersion (cm)
0	-	28
10	mix	23.3
10	layer	27.5
30	mix	12.5
30	layer	19.3

The results show a high liquid dispersion in those test bodies in which the superabsorbents were laid in layers in comparison with the test bodies in which the superabsorbents were mixed with the pulp fibres. This enables the liquid to reach a large proportion of the superabsorbent particles distributed in the absorbent body.

Retentiveness

The retentiveness of test bodies corresponding to those used in the above tests was measured, i.e. the amount of liquid that respective test bodies were able to retain when subjected to load. The tests were carried out in the following manner: The test bodies were weighed and then submerged in test liquid for 5 minutes, after which they were removed from the liquid. The test bodies were then subjected to a load of 10 kPa for 1 minute and then weighed. The liquid retentiveness of the bodies was determined as: $(m_2 - m_1)/m_1$ (g/g), where

m_1 = weight of dry test body

m_2 = weight of wet test body

The results are shown in Table 5.

Table 5

Superabsorbent (%)	Mix/Layer	Retentiveness (g/g)
0	-	7.2
10	mix	8.8
10	layer	9.1
30	mix	11.8
30	layer	13.4

The results show a higher degree of retentiveness in those test bodies in which the superabsorbents were present in layers than those test bodies in which the superabsorbents were mixed with the pulp fibres.

In summary, it can be established that the tests carried out show improved absorption properties in respect of test bodies corresponding to the inventive second absorbent layer in which the superabsorbents were placed in a layer between layers of pulp fibres. In combination with an upper absorbent layer having an open fibre structure and low liquid dispersion ability and which therewith is able to receive large quantities of liquid over a short period of time, an absorbent body which possesses very good absorption properties has been produced in accordance with the invention.

10 Claims

1. An absorbent body which is intended to form the absorbent element of an absorbent article, such as a diaper, an incontinence guard or a sanitary napkin and which includes a first fibre-based absorbent layer which is intended to lie proximal to the wearer in use, and a second fibre-based absorbent layer which is intended to lie distal to the wearer in use, this second layer exhibiting a high liquid-dispersing ability, **characterized** by the combination that the first layer (16) includes a superabsorbent material (18) of high gel-strength having the ability to swell substantially unaffected by normally occurring pressure forces, which is admixed essentially uniformly in the fibre material within at least one area of the layer, and that the second layer (17) includes at least one layer (20) of superabsorbent material disposed between fibre layers (17a, 17b).
2. An absorbent body according to Claim 1, **characterized** in that the first layer (16) has a low liquid-dispersing ability.
3. An absorbent body according to Claim 1 or 2, **characterized** in that the superabsorbent material (20) in the second layer (17) has high gel-strength.
4. An absorbent body according to one or more of the preceding Claims, **characterized** in that the major part of the fibre material in the first layer (16) is comprised of fluff-pulp having an open fibre structure and a critical bulk above 8 cm³/g at 2.5 kPa; and in that the fibre material in the second layer (17) in at least the first fibre layer (17a) of said second layer (17) lying proximal to the first layer (16) is comprised mainly of another type of fluff-pulp having a critical bulk beneath 8 cm³/g at 2.5 kPa and has a higher liquid-dispersing ability than the fluff-pulp in the first layer (16).
5. An absorbent body according to Claim 4, **characterized** in that the first layer (16) is comprised mainly of a fluff-pulp having a fibre weight between 180 and 600 mg/km; and in that at least the first fluff-pulp layer (17a) of the second layer (17) is comprised mainly of a fluff-pulp having a fibre weight between 140 and 190 mg/km.
6. An absorbent body according to Claim 5, **characterized** in that the first layer (16) is comprised mainly of a chemi-thermomechanical fluff-pulp; and in that at least 60% of the first fluff-pulp layer (17a) of the second layer (17) is comprised of a chemical fluff-pulp.
7. An absorbent body according to one or more of the preceding Claims, **characterized** in that the first layer (16) contains between 2 and 30%, preferably between 2 and 15% superabsorbent material calculated on the total dry weight of the layer.
8. An absorbent body according to one or more of the preceding Claims, **characterized** in that the proportion of superabsorbent material in the second layer (17) is between 2 and 60%, preferably between 10 and 50%, calculated on the total dry weight of the layer in the area or areas of the layer (17) in which the superabsorbent material is distributed.
9. A diaper containing an absorbent body enclosed in a casing (1, 2), and having a back part (4) which is intended to be placed rearwardly on a wearer in use, a front part (5) which is intended to be placed forwardly on the wearer in use, and a crotch part which extends between the back part (4) and the front part (5) and which is intended to be placed in the crotch region of the wearer in use, between the thighs thereof, **characterized** in that as seen from the side of the diaper proximal to the wearer in use, the absorbent body (3) includes a first fibre-based absorbent layer (16) and a second fibre-based absorbent layer (17) which exhibits a high liquid-dispersing ability, wherein the first absorbent layer (16) includes a superabsorbent material (18) of high gel-strength having the ability to swell substantially unaffected by normally occurring pressure forces, mixed essentially uniformly in the fibre material within at least one area of the layer, and the second layer (17) includes at least one layer (20) of superabsorbent material

disposed between fibre layers (17a, 17b).

10. A diaper according to Claim 9, characterized in that the first absorbent layer (16) extends over only a part of the surface area of the second absorbent layer (17), wherein the first absorbent layer (16) is located essentially in the crotch part (6) of the diaper.

Patentansprüche

1. Absorptionskörper, der dazu bestimmt ist, ein absorbierendes Element eines Absorptionsartikels, wie beispielsweise eine Windel, ein Inkontinenzschutz oder eine Hygienebinde, zu bilden und der eine erste faserbasierende Absorptionsschicht, die während der Benutzung dazu bestimmt ist, näher am Träger zu liegen, und eine zweite faserbasierende Absorptionsschicht beinhaltet, die während der Benutzung dazu bestimmt ist, vom Träger entfernt zu liegen, wobei diese zweite Schicht eine hohe Flüssigkeitsverteilungsfähigkeit aufweist, **gekennzeichnet, durch** die Kombination, daß die erste Schicht (16) ein superabsorbierendes Material (18) mit hoher Gelfestigkeit beinhaltet, das die Eigenschaft besitzt, bei normalerweise auftretenden Druckkräften im wesentlichen unbeeinflusst aufzuquellen, und daß die zweite Schicht (17) zumindest eine Schicht (20) aus superabsorbierendem Material beinhaltet, die zwischen Faserschichten (17a, 17b) angeordnet ist.
2. Absorptionskörper nach Anspruch 1, **dadurch gekennzeichnet, daß** die erste Schicht (16) eine niedrige Flüssigkeitsverteilungsfähigkeit hat.
3. Absorptionskörper nach Anspruch 1 oder 2, **dadurch gekennzeichnet, daß** das superabsorbierende Material (20) in der zweiten Schicht (17) eine hohe Gelfestigkeit hat.
4. Absorptionskörper nach einem oder mehreren der voranstehenden Ansprüche, **dadurch gekennzeichnet, daß** der Hauptteil des Fasermaterials in der ersten Schicht (16) aus einem Fluff-Zellstoff (fluff-pulp) besteht, der eine offene Faserstruktur und ein kritisches Volumen von 8 cm³/g bei 2,5 kPa hat, und daß das Fasermaterial in der zweiten Schicht (17) in der zumindest einen ersten Schicht (17a) der zweiten Schicht (17), die nahe der ersten Schicht (16) liegt, aus hauptsächlich einer anderen Art von Fluff-Zellstoff (fluff-pulp) besteht, der ein kritisches Volumen unterhalb 8 cm³/g bei 2,5 kPa hat und eine höhere Flüssigkeitsverteilungsfähigkeit besitzt als der Fluff-Zellstoff der ersten Schicht.
5. Absorptionskörper nach Anspruch 4, **dadurch gekennzeichnet, daß** die erste Schicht (16) hauptsächlich aus einem Fluff-Zellstoff besteht, der ein Fasergewicht zwischen 180 und 600 mg/km hat, und daß zumindest die erste Fluff-Zellstoffschicht (17a) der zweiten Schicht (17) hauptsächlich aus einem Fluff-Zellstoff besteht, der ein Fasergewicht zwischen 140 und 190 mg/km hat.
6. Absorptionskörper nach Anspruch 5, **dadurch gekennzeichnet, daß** die erste Schicht (16) hauptsächlich aus einem chemithermomechanischen Fluff-Zellstoff besteht, und daß zumindest 60% der ersten Fluff-Zellstoffschicht (17a) der zweiten Schicht (17) aus einem chemischen Fluff-Zellstoff bestehen.
7. Absorptionskörper nach einem oder mehreren der voranstehenden Ansprüche, **dadurch gekennzeichnet, daß** die erste Schicht (16) zwischen 2 und 30%, vorzugsweise zwischen 2 und 15% superabsorbierendes Material beinhaltet, berechnet auf das Gesamtrockengewicht der Schicht.
8. Absorptionskörper nach einem oder mehreren der voranstehenden Ansprüche, **dadurch gekennzeichnet, daß** der Anteil an superabsorbierendem Material in der zweiten Schicht (17) zwischen 2 und 60%, vorzugsweise zwischen 10 und 50% beträgt, berechnet auf das Gesamtrockengewicht der Schicht in dem Bereich oder den Bereichen der Schicht (17), in denen das superabsorbierende Material verteilt ist.
9. Windel mit einem Absorptionskörper, der in eine Hülle (1, 2) eingeschlossen ist und ein Rückteil (4), das dazu bestimmt ist, während der Benutzung an einem Träger nach hinten zu zeigen, ein während der Benutzung an einem Träger nach vorn zu richten bestimmtes Vorderteil (5) und ein Schrittteil beinhaltet, das sich zwischen dem Rückteil (4) und dem Vorderteil (5) erstreckt und während der Benutzung dazu bestimmt ist, im Schritt des Trägers, zwischen dessen Schenkeln, zu liegen, **dadurch gekennzeichnet, daß** der Absorptionskörper (3), von der Windelseite aus gesehen, die während der Benutzung dem Träger naheliegt, eine erste faserbasierende Absorptionsschicht (16) und eine zweite faserbasierende, eine hohe Flüssigkeitsverteilungsfähigkeit aufweisende Absorptionsschicht (17) beinhaltet, wobei die erste Absorptionsschicht (16) ein superabsorbierendes Material (18)

mit hoher Gelfestigkeit beinhaltet, das die Eigenschaft besitzt, bei normalerweise auftretenden Druckkräften im wesentlichen unbeeinflusst aufzuquellen, das in dem Fasermaterial innerhalb zumindest eines Bereichs der Schicht gleichförmig verteilt ist, und die zweite Schicht (17) zumindest eine Schicht (20) aus superabsorbierendem Material beinhaltet, die zwischen Faserschichten (17a, 17b) angeordnet ist.

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10. Windel nach Anspruch 9, **dadurch gekennzeichnet**, daß sich die erste Absorptionsschicht (16) nur über einen Teil des Oberflächenbereichs der zweiten Absorptionsschicht (17) erstreckt, wobei die erste Absorptionsschicht (16) im wesentlichen im Schrittteil (6) der Windel liegt.

10 Revendications

1. Corps absorbant qui est destiné à former l'élément absorbant d'un article absorbant, tel qu'une couche-culotte, un protection contre les incontinences ou une serviette hygiénique et qui comprend une première couche absorbante à base de fibres qui est destinée à être la plus près de l'utilisateur pendant l'utilisation et une deuxième couche absorbante à base de fibres qui est destinée à se trouver la plus loin de l'utilisateur pendant l'utilisation, cette deuxième couche présentant une aptitude élevée à disperser les liquides, caractérisé en ce que la première couche (16) comprend un matériau superabsorbant (18) de résistance de gel élevée, dont l'aptitude à gonfler n'est pratiquement pas affectée par les forces de compression apparaissant normalement et qui est mélange, de façon essentiellement uniforme dans le matériau fibreux à l'intérieur d'au moins une zone de la couche, et en ce que la deuxième couche (17) comprend au moins une couche (20) d'un matériau superabsorbant disposé entre des couches de fibres (17a, 17b).
2. Corps absorbant selon la revendication 1 caractérisé en ce que la première couche (16) possède une faible aptitude à disperser les liquides.
3. Corps absorbant selon la revendication 1 ou 2, caractérisé en ce que le matériau superabsorbant (20) présent dans la deuxième couche (17) possède une résistance de gel élevée.
4. Corps absorbant selon une ou plusieurs des revendications précédentes, caractérisée en ce que la majeure partie du matériau fibreux présent dans la première couche (16) est constituée par une pâte fluff à structure de fibres ouvertes présentant une voluminosité critique supérieure à $8 \text{ cm}^3/\text{g}$ à 2,5 kPa et en ce que le matériau fibreux présent dans la deuxième couche (17), dans au moins la première couche (17a) de fibres de ladite deuxième couche (17) située la plus près de la première couche (16), est constitué principalement par un autre type de pâte fluff présentant une voluminosité critique inférieure à $8 \text{ cm}^3/\text{g}$ à 2,5 kPa et possède une aptitude à disperser les liquides plus élevée que la pâte fluff de la première couche (16).
5. Corps absorbant selon la revendication 4, caractérisé en ce que la première couche (16) est constituée principalement d'une pâte fluff présentant une poids de fibres compris entre 180 et 600 mg/km et en ce qu'au moins la première couche (17a) de pâte fluff de la deuxième couche (17) est constituée principalement d'une pâte fluff présentant un poids de fibres compris entre 140 et 190 mg/km.
6. Corps absorbant selon la revendication 5, caractérisé en ce que la première couche (16) est constituée principalement d'une pâte fluff chimico-thermomécanique et en ce qu'au moins 60% de la première couche de pâte fluff (17a) de la deuxième couche (17) est constituée d'une pâte fluff chimique.
7. Corps absorbant selon une ou plusieurs des revendications précédentes, caractérisé en ce que la première couche (16) contient entre 2 et 30%, de préférence entre 2 et 15%, de matériau superabsorbant calculés sur le poids total à sec de la couche.
8. Corps absorbant selon une ou plusieurs des revendications précédentes, caractérisé en ce que la proportion de matériau superabsorbant présent dans la deuxième couche (17) est compris entre 2 et 60%, de préférence entre 10 et 50%, calculés sur le poids total à sec de la couche dans la ou les zones de la couche (17) dans laquelle le matériau superabsorbant est réparti.
9. Couche-culotte contenant un corps absorbant enfermé dans une enveloppe (1, 2) et comportant une partie arrière (4) qui est destinée à être placée en arrière sur un utilisateur pendant l'utilisation, une partie avant (5) qui est destinée à être placée en avant de l'utilisateur pendant l'utilisation, et une partie d'entre-jambe qui s'étend entre la partie arrière (4) et la partie avant (5) et qui est destinée à être placée, pendant l'utilisation, dans la région d'entre-

jambe de l'utilisateur. entre les cuisses de ce dernier, caractérisée en ce que, comme on peut le voir depuis le côté de la couche-culotte situé le plus près de l'utilisateur pendant l'utilisation, le corps absorbant (3) comprend une première couche absorbante (16) à base de fibres et une deuxième couche absorbante (17) à base de fibres qui possède une aptitude élevée à la dispersion des liquides, la première couche absorbante (16) comprenant un matériau superabsorbant (18) présentant une résistance de gel élevée, dont l'aptitude à gonfler n'est pratiquement pas affectée par les forces de compression apparaissant normalement et qui est mélangé de façon essentiellement uniforme dans le matériau fibreux à l'intérieur d'au-moins une zone de la couche, et la deuxième couche (17) comprend au moins une couche (20) de matériau superabsorbant, disposée entre les couches de fibres (17a, 17b).

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- 10 10. Couche-culotte selon la revendication 9, caractérisée en ce que la première couche absorbante (16) s'étend sur une partie seule-ment de la superficie de la deuxième couche absorbante (17), la première couche absorbante (16) étant située essentiellement dans la partie d'entre-jambe (6) de la couche-culotte.

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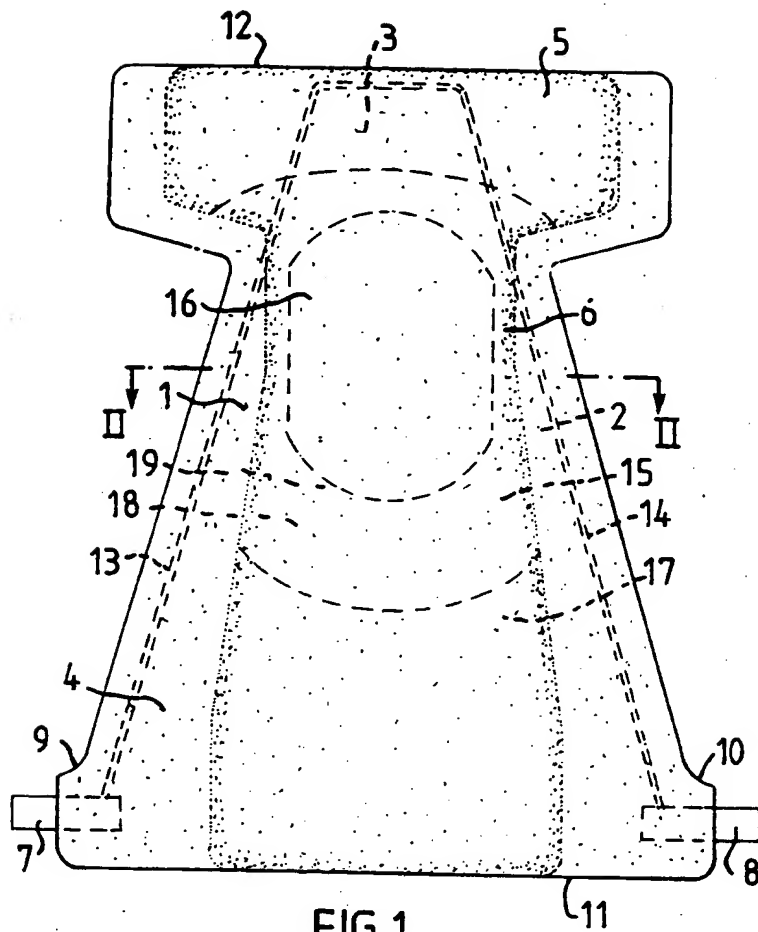


FIG. 1

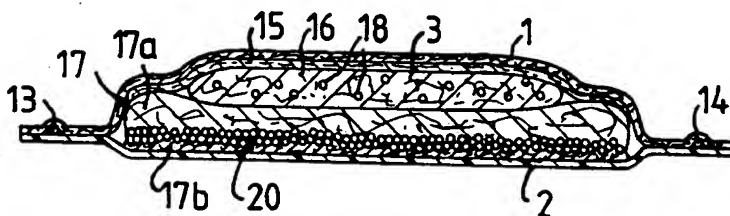


FIG. 2

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